SOY ISOFLAVONES EXTRACT EFFECTS ON EXPERIMENTAL ACUTE ALCOHOL INTOXICATION IN HUMANS

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Introduction

Soy extracts contain isoflavones that produce a number of biological activities. Its consumption has been associated with lower cardiovascular diseases, osteoporosis, hormone-dependent cancers, adverse menopausal manifestations and age-related cognitive decline. Genistein and equol are agonist of the estrogen receptor (ER)/beta. Recently, daidzin-daidzein has been reported to inhibit the aldehyde-dehydrogenase-2 enzyme (ALDH2), and has been used in animals to reduce alcohol and cocaine use.

The aim of this study was to evaluate the possible interaction of a soy extract product in the pharmacokinetics and effects of ethanol.

Methods

Ten healthy male volunteers participated in the study. The study was randomized and cross-over. Subjects participated in two experimental sessions, in one received a single dose of alcohol (0.5 g/kg, Vodka Absolut, Sweden), in the other received four capsules of a soy extract product (Super-Absorbable Soy Isoflavones, Life-Extension, US) and two hours later the same dose of alcohol. Capsules total content was: total isoflavones 216 mg, daidzin-daidzein 80 mg, genistein 108 mg and glycitein 24 mg. Blood samples were obtained. Ethanol was determined in blood (Diagnostic Reagent Enzyme Immunoassays) and breath. Daidzein, genistein and the êndogenous metabolite equol were determined by liquid chromatography coupled to tandem mass spectrometry (LC/MS/MS). Vital signs (blood pressure, heart rate, oral and facial temperature), alcohol subjective and adverse effects (Visual Analogue Scales [VAS] and Addiction Research Center Inventory-49 item [ARCI]) were evaluated. Area under the curve (AUC), peak concentration or effect (C_{max} or E_{max}) from 0 to 10 h after administration were calculated for all outcomes and compared by the Student's t test for paired samples. For time to reach maximum concentration or effect (t_{max}) a Wilcoxon test was used. Time course of concentrations or effects were compared with a repeated measures ANOVA with two factors (treatment and time).

Results

The volunteers had a mean age and weight of 23.9 years and 73.7 kg, respectively. All of them consumed ethanol regularly (10.2 UBE/week; 1 UBE= 10 g of pure ethanol).

No differences were found in blood and breath ethanol concentrations between alcohol and soy extract + alcohol conditions (figure 1). Two isoflavones of the soy extract were absorbed and showed several peaks in plasma suggesting enterohepatic recirculation (Figure 2). Ethanol subjective and adverse effects (drunkenness figure 3], euphoria, nausea, dizziness, face flushing and vertigo) were also very similar between conditions, except for headache (higher at 8h after alcohol alone). No differences were found in ARCI subscales. Regarding vital signs no differences were found in blood pressure, heart rate (figures 4-6) and oral and facial temperature between treatments. A slightly higher reduction of diastolic blood pressure was found 2,3,4 and 8 h after administration (*p<0.05, **p<0.01) with alcohol alone in comparison with soy extract + alcohol.

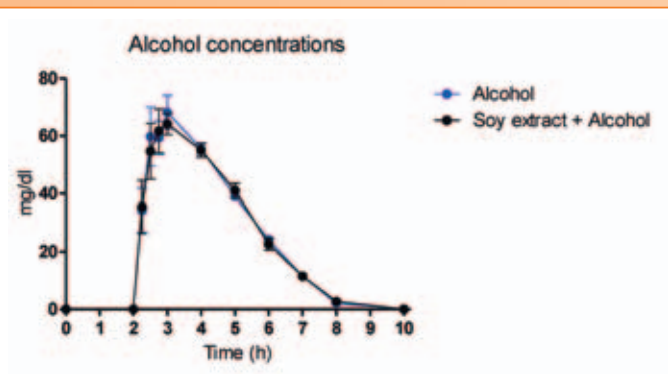


Fig. 1. Blood alcohol concentrations from 0 to 10 h after administration.

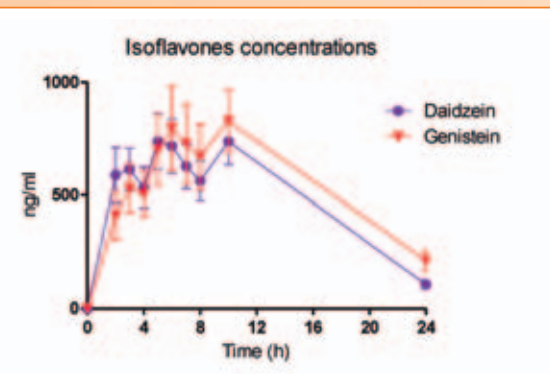


Fig. 2. Daidzein and genistein plasma concentrations from 0 to 24 h after administration.

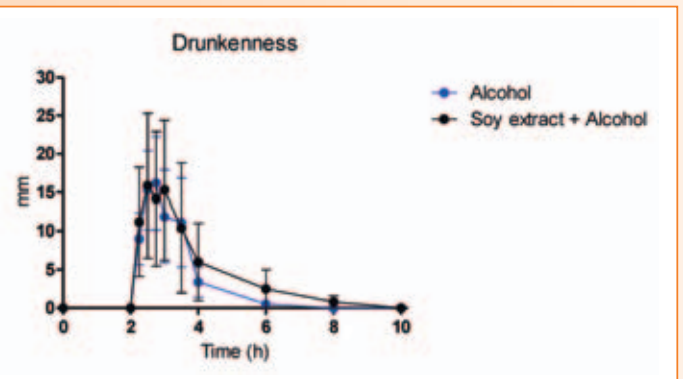
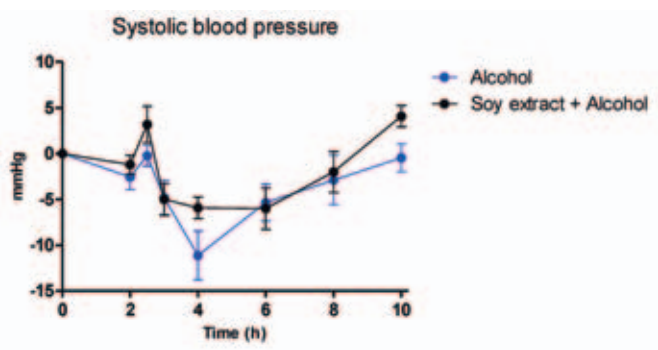
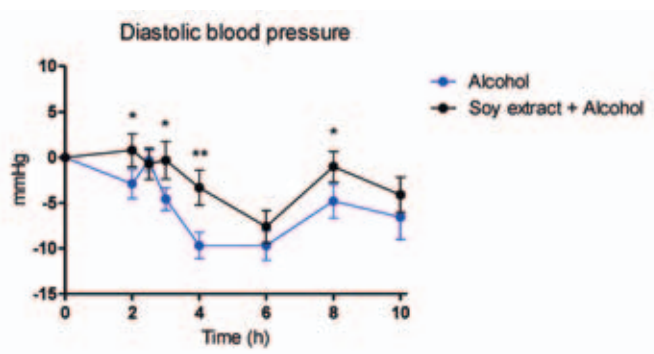
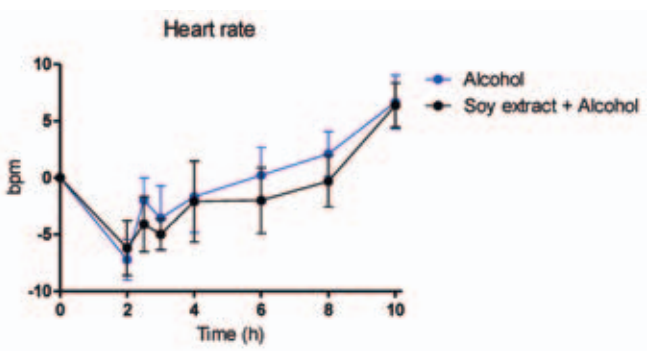


Fig. 3. Drunkenness feelings from 0 to 10 h after administration. VAS (0-100 mm).







Figures 4-6. Systolic and diastolic blood pressure and heart rate (from 0 to 10 h after administration.)

Conclusions

The administration of a soy extract, at a dose which is twice the daily recommended dose for menopausal symptoms, did not interact with a moderate dose of alcohol.

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